be accounted for, as far as I have studied them, in any other way. The removal of a tremendous thickness of ice from the White Mountains would naturally require crustal readjustment of no small order, and hence a large earthquake or several of them would not be strange.

The evidences for an earthquake as the principal cause of the confusion in Lost River are: slickenside-like patches on a joint block over which another block had violently slipped; lateral movements among the blocks; the pell-mell manner in which the blocks are heaped; the great rock fall from the cliff, which probably came simultaneously with the shock in the river; the inadequacy of frost action to explain all of the confusion; and the elimination of the disruptive force of a moving glacier.

Although this evidence, positive and negative, does not prove that there was an earthquake in Kinsman Notch, it gives good ground for believing that there was such a shock. I have not overlooked the possibility of a local shock due to the rock fall itself. The effects observed appear too great for the vibrations a rock fall would be expected to produce.

I am greatly indebted to Dr. Philip W. Ayres, Forester of the Society for Protection of New Hampshire Forests, for guiding me to several important caverns which otherwise I must have overlooked.

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AN ANALYSIS OF THE FACTORS CONCERNED IN THE HEREDITY OF COLOR IN TUMBLER PIGEONS[1]

WHEREAS the usual methods for study of heredity serve only to show us the relation of one character to another, this work is an attempt to give our terms concerning heredity of color a real representation in the anatomy and physiology of the bird.

Some of the factors identified in these birds by breeding experiments follow: Red (*R*), Black (*B*), Intense (*I*), Spreading factor (*S*).

The *R* factor (in absence of *B*) is associated with the formation of a melano-protein pigment, distinctly (pigeon) red in color, easily soluble in hot 4 per cent. sodium hydroxide. This pigment is found in reds and yellows. When *B* is present the chemical processes in the skin are profoundly changed, and a dead black exceedingly insoluble pigment is formed. *B* is completely dominant to *R*.

The effects of factor *I*, as seen macroscopically, are quantitative only. When *I* acts on red pigment there is 3.5 times more pigment formed, than when *I* is absent. Acting on black pigment *I* has a value of about 3. The physical form of the pigment is also influenced by *I*. In its absence red pigment exists as irregular masses, when it is present red pigment takes the form of small spherical granules about .4 micron in diameter, etc. On the other hand black pigment exists as spheres even in absence of *I*. When *I* is present black pigment sometimes may exist as rods.

The spreading factor *S* effects a uniform distribution of pigment throughout the barbule. When this factor is absent the pigment is aggregated in clumps, near the center of each barbule cell. This condition changes black to blue and dun to silver. The *S* factor also has an influence on granule form—and this influence varies with the presence or absence of *I*.

There is apparently a far greater mutual modification and interaction of factors in these birds than formulæ derived from external appearance alone indicate.

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[1] Abstract of a paper read before the American Society of Zoologists, Cleveland, January 1, 1913.

A NEW WALNUT

I THINK it desirable to place before the public the fact that I have been growing for eight or ten years a walnut hybrid originating from seed of *Juglans californica* which is a hybrid between that species and some tree, probably a *Quercus* of evergreen habit. As this new form comes true from seed and may be propagated indefinitely, it is worthy of a